GATES LEARJET CORPORATION

maintenance manual

CHAPTER

39

ELEC /ELCTNC PNLS & MULTIPURPOSE PARTS

Chapter Eight

Conclusion

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GENERAL - DESCRIPTION AND OPERATION

1. Description
 - A. This chapter describes and pictorially presents instruments and panels that mount the instruments, switches, and indicators necessary for operation of the aircraft. These panels are installed in the flight compartment and are referred to as the instrument panel, glareshield and center pedestal assemblies.
 - B. The instrument panel, glareshield, and center pedestal assemblies are divided into various subpanels, according to function.
 - C. Multipurpose parts include the freon and stabilizer heater relay box, the main switch panel and the squat switch relay panel.

GENERAL - MAINTENANCE PRACTICES

1. General
 A. Prior to performing instrument or control panel maintenance, maintenance personnel should familiarize themselves with the following safety precautions.

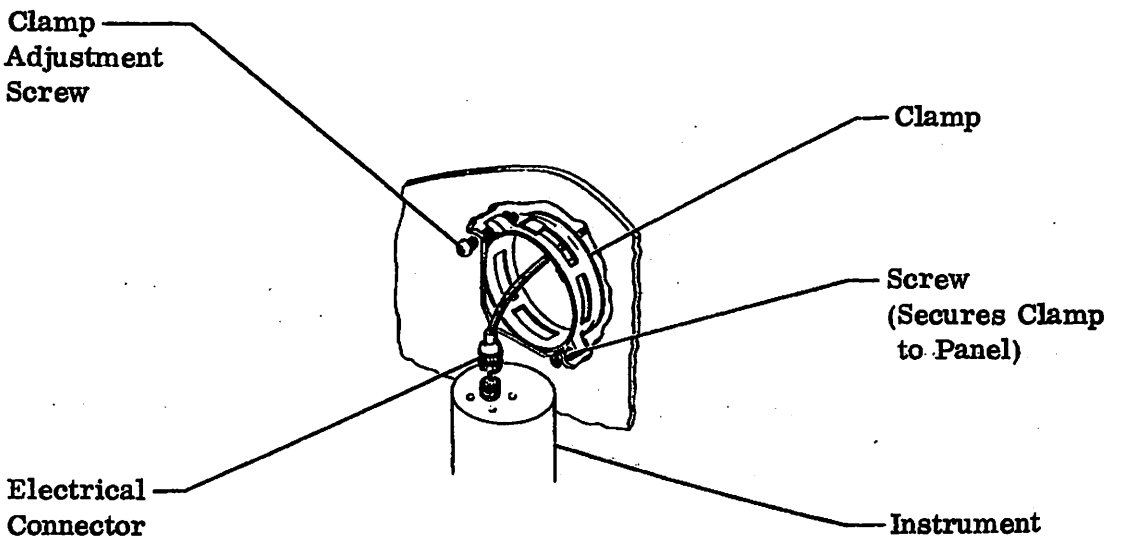
2. Safety Precautions
 A. Safety Precautions
 (1) Pull and tag applicable system circuit breaker.
 (2) Assure Battery and Stall Warning Switches are off prior to lowering any instrument panel.
 (3) Protect instrument face by suitable means.

3. Removal/Installation

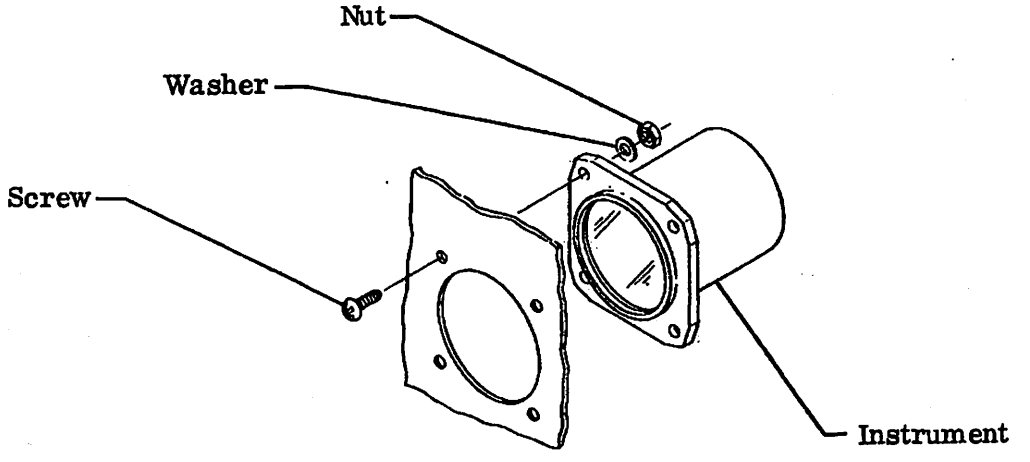
 NOTE: The following instructions give typical removal and installation procedures for instruments.

 A. Remove Panel Component (See figure 201)
 (1) Assure that Battery and Stall Warning Switches are OFF.
 (2) Pull and tag applicable system or instrument circuit breaker.
 (3) Remove screws and lower applicable instrument panel.
 (4) Disconnect electrical plug, static or pitot line from instrument if applicable.
 (5) Cap all exposed fittings if applicable.
 (6) Remove attaching parts and instrument from instrument panel.
 B. Install Panel Component (See figure 201)
 (1) Install instrument in panel and secure with attaching parts.
 (2) Remove caps from fittings.
 (3) Connect electrical plug, static or pitot line to instrument, if applicable.
 (4) Raise and secure instrument panel.
 (5) Reset applicable system or instrument circuit breaker.
 (6) Perform operational check of pitot and static system if applicable.

4. Cleaning Instrument Glass Lenses
 A. All instrument glass lenses should be cleaned at frequent intervals. Whenever instruments with glass lenses are handled, precautionary cleaning should be performed as fingerprint perspiration may permanently etch glass surfaces.
 B. Cleaning may be accomplished by using a commercial liquid detergent or a solvent such as isoprophyl alcohol or acetone. If solvent is used, care should be taken to insure compatibility of the instrument mounting finish with the solvent.



Instrument Installation
(Two-Screw Type Clamp Shown,
Four-Screw Type Similar)



Instrument Installation
(Screw, Washer, and Nut)

Panel Component Installation (Typical)
Figure 201

C. Prior to applying cleaning solution to lens surface, all loose dust should be blown off with clean, dry air. A clean, soft cloth must be used for both cleaning and drying.

D. The cleaning process can cause static electricity to build up in the lens. Each glass lens should be touched gently with a metallic object to insure dissipation of any possible static charge.

E. Cleaning Lenses

(1) Prepare cleaning solution according to manufacturer's directions.

(2) Apply solution to lens.

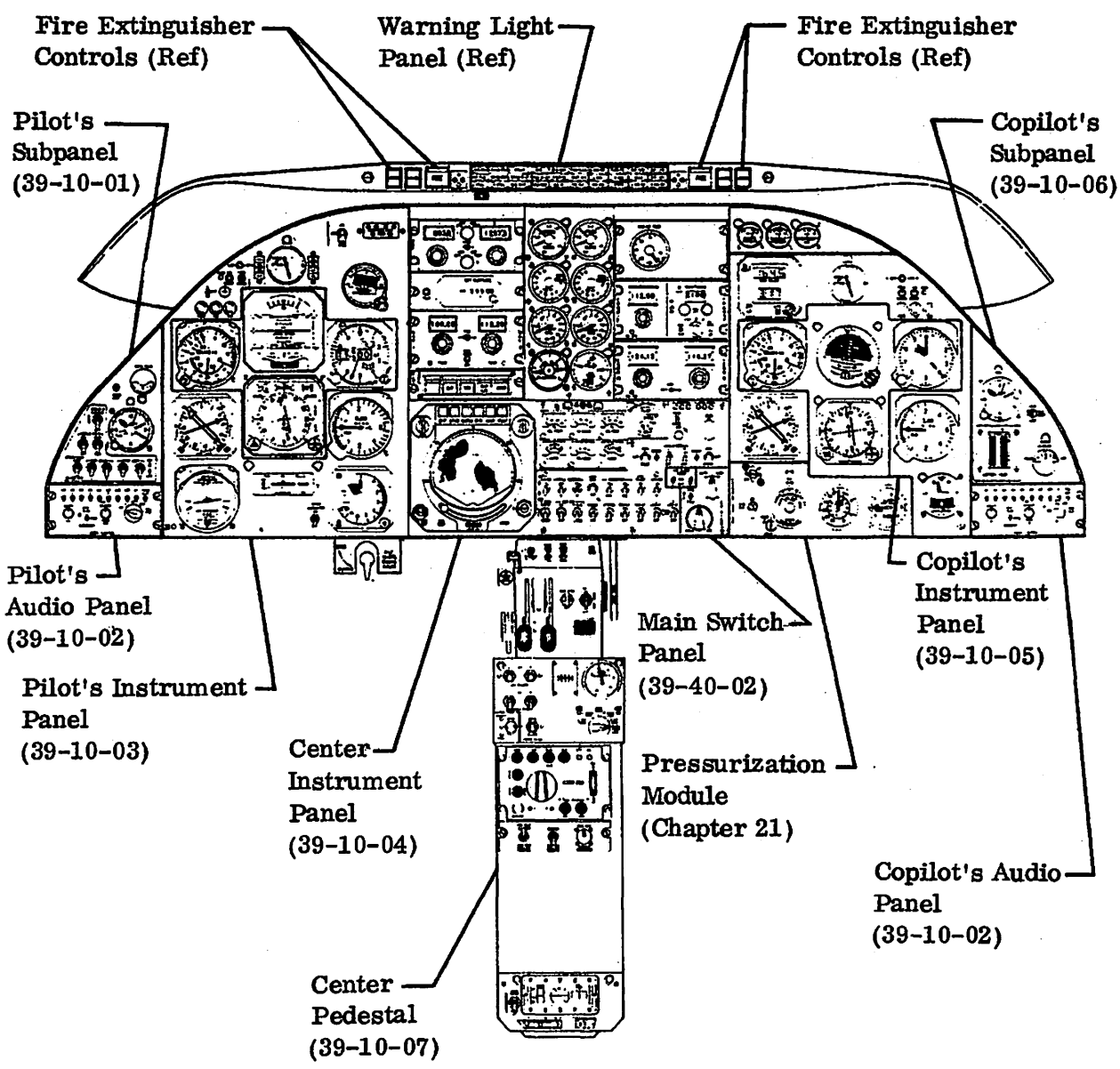
(3) Apply clear rinse water.

(4) Wipe lens dry immediately.

CAUTION: FAILURE TO WIPE LENS IMMEDIATELY MAY RESULT IN STAINING WHICH COULD PERMANENTLY DAMAGE LENS SURFACE.

PANELS - DESCRIPTION AND OPERATION

1. Description (See figure 1)
 - A. The instrument panel consists of the pilot's subpanel, pilot's audio panel, pilot's instrument panel, center instrument panel, copilot's instrument panel, copilot's subpanel, copilot's audio panel, and the switch panel.
 - B. The center pedestal consists of the forward pedestal and quadrant section and the aft pedestal section.
 - (1) The forward pedestal and quadrant provides mounting for the throttle, spoiler, flap, parking brake and emergency brake controls.
 - (2) The aft pedestal provides for mounting of radio equipment, trim switch panel, trim indicator panel, fuel control panel, autopilot controller and yaw damper control head.
 - C. The glareshield consists of the warning light panel and the fire extinguisher controls.



Glareshield, Instrument Panel, and Center Pedestal General Arrangement
Figure 1

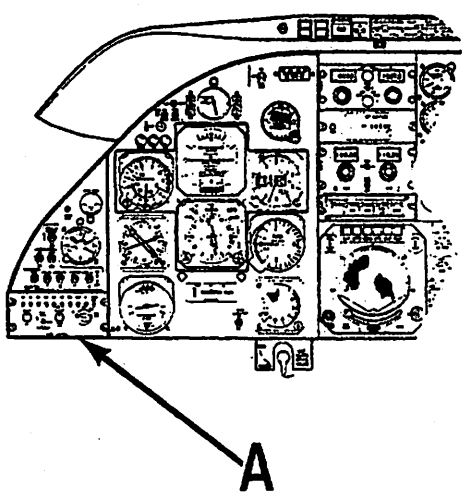
PILOT'S SUBPANEL - MAINTENANCE PRACTICES

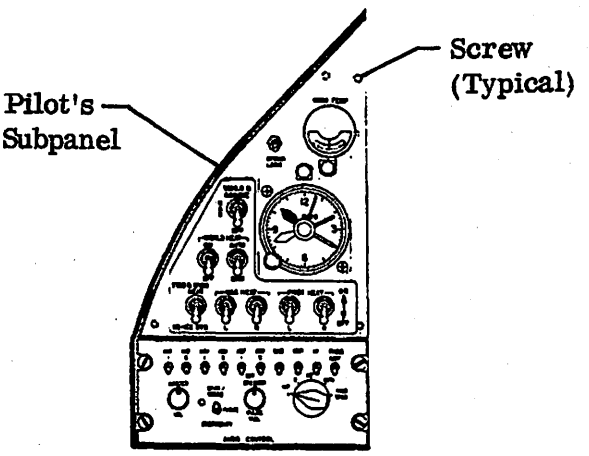
1. Removal/Installation

NOTE: • The pilot's subpanel is secured to the instrument panel structure by screws.
• The pilot's subpanel assembly consists of a structure assembly and various switches and indicators.

A. Remove Pilot's Subpanel (See figure 201)
(1) Assure that Battery and Stall Warning Switches are OFF.
(2) Pull all applicable system circuit breakers.
(3) Remove attaching parts securing subpanel to instrument panel structure.
(4) Disconnect electrical connectors.
(5) Remove subpanel assembly.

B. Install Pilot's Subpanel (See figure 201)
(1) Position subpanel on instrument panel structure and connect electrical connectors.
(2) Secure subpanel to instrument panel with attaching parts.
(3) Reset applicable circuit breakers.
(4) Perform an operational check of applicable system.





Detail A

Typical Pilot's Subpanel Assembly
Figure 201

PILOT'S AND COPILOT'S AUDIO CONTROL PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Audio Control Panel (See figure 201)

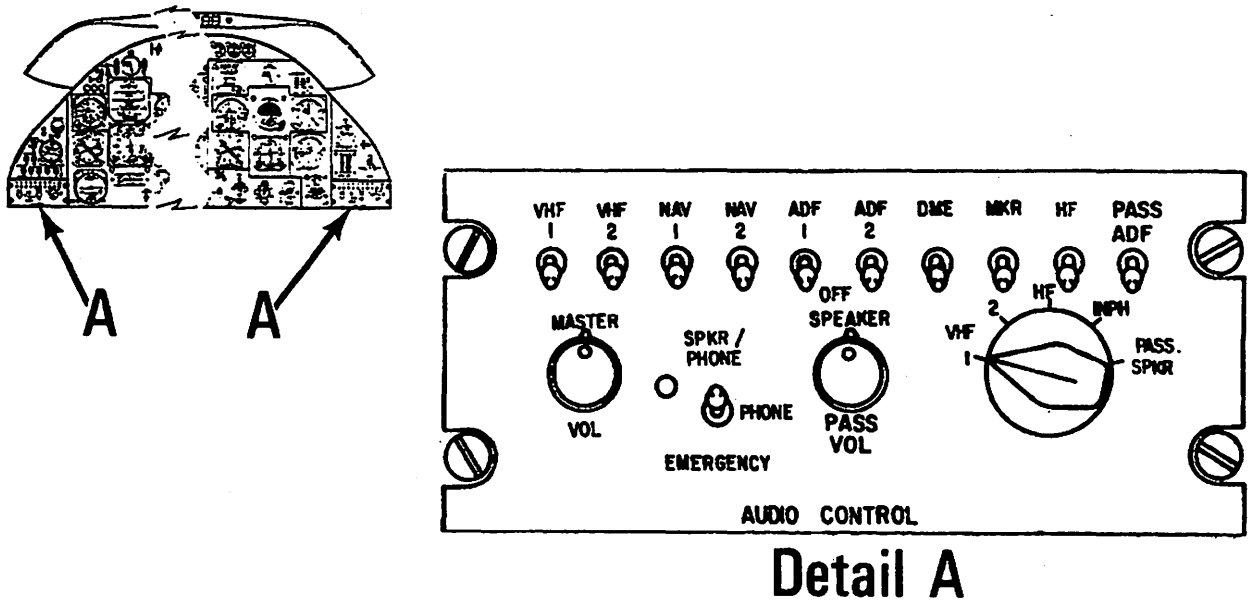
NOTE: • The audio control panels are secured to the instrument panel structure by screws. A receptacle, mounted to the back of the panel, connects the panel electrically with the aircraft wiring.
• The following removal instructions are applicable to either audio panel.

(1) Assure that Battery and Stall Warning Switches are OFF.
(2) Pull and tag applicable system circuit breakers.
(3) Loosen quick release fasteners securing audio panels.
(4) Disconnect electrical connector from audio panel.
(5) Remove audio panel from instrument panel structure.

B. Install Audio Control Panel (See figure 201)

NOTE: The following installation instructions are applicable to either audio panel.

(1) Position audio panel in instrument panel and connect electrical connector to audio panel.
(2) Secure audio panel with quick release fasteners.
(3) Reset applicable circuit breakers.



Typical Audio Control Panel
Figure 201

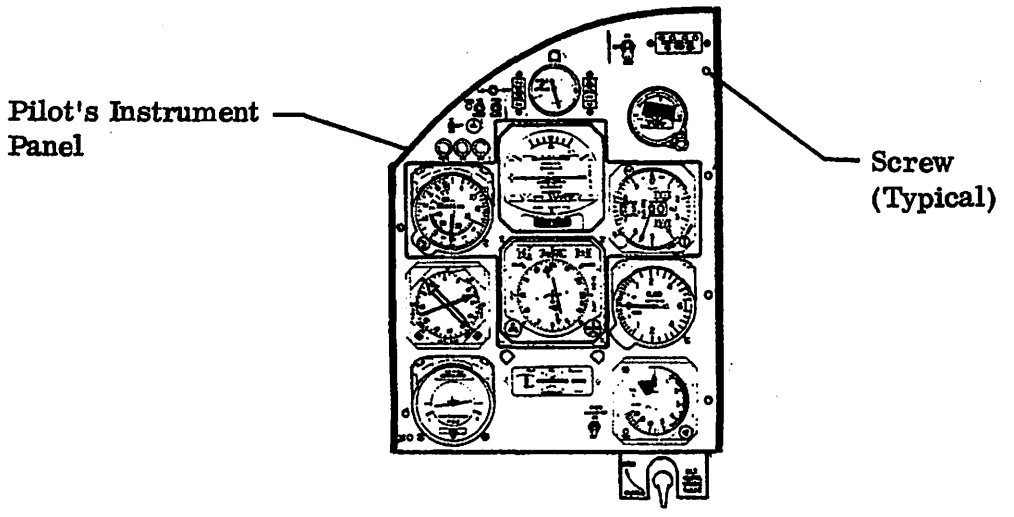
PILOT'S INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: • The lower edge of the pilot's instrument panel is hinged to the instrument panel installation structure and can swing back and down for easy access and maintenance of panel components. Pilot's panel is secured in place against the structure by screws.
• The pilot's instrument panel assembly consists of a structure assembly and various optional and standard instruments and switches.

A. Remove Pilot's Instrument Panel (See figure 201)
(1) Assure that Battery and Stall Warning Switches are OFF.
(2) Pull and tag applicable circuit breakers.
(3) Remove screws securing panel to structure.
(4) Lower panel and disconnect electrical connectors, pitot and static lines from instruments.
(5) Tag all electrical wiring plugs.
(6) Cap all exposed pitot and static lines.
(7) Remove attaching parts securing hinges to instrument panel and remove panel from aircraft.

B. Install Pilot's Instrument Panel (See figure 201)
(1) Position instrument panel and secure to hinges with attaching parts.
(2) Remove caps from pitot and static lines and connect to its respective instrument.
(3) Connect electrical connectors to applicable instruments and panels.
(4) Raise and secure panel to main instrument panel structure.
(5) Perform pitot/static leakage check (refer to Chapter 34).
(6) Reset applicable circuit breakers.



Typical Pilot's Instrument Panel
Figure 201

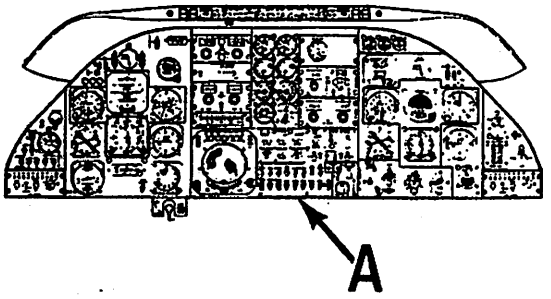
CENTER PANEL - MAINTENANCE PRACTICES

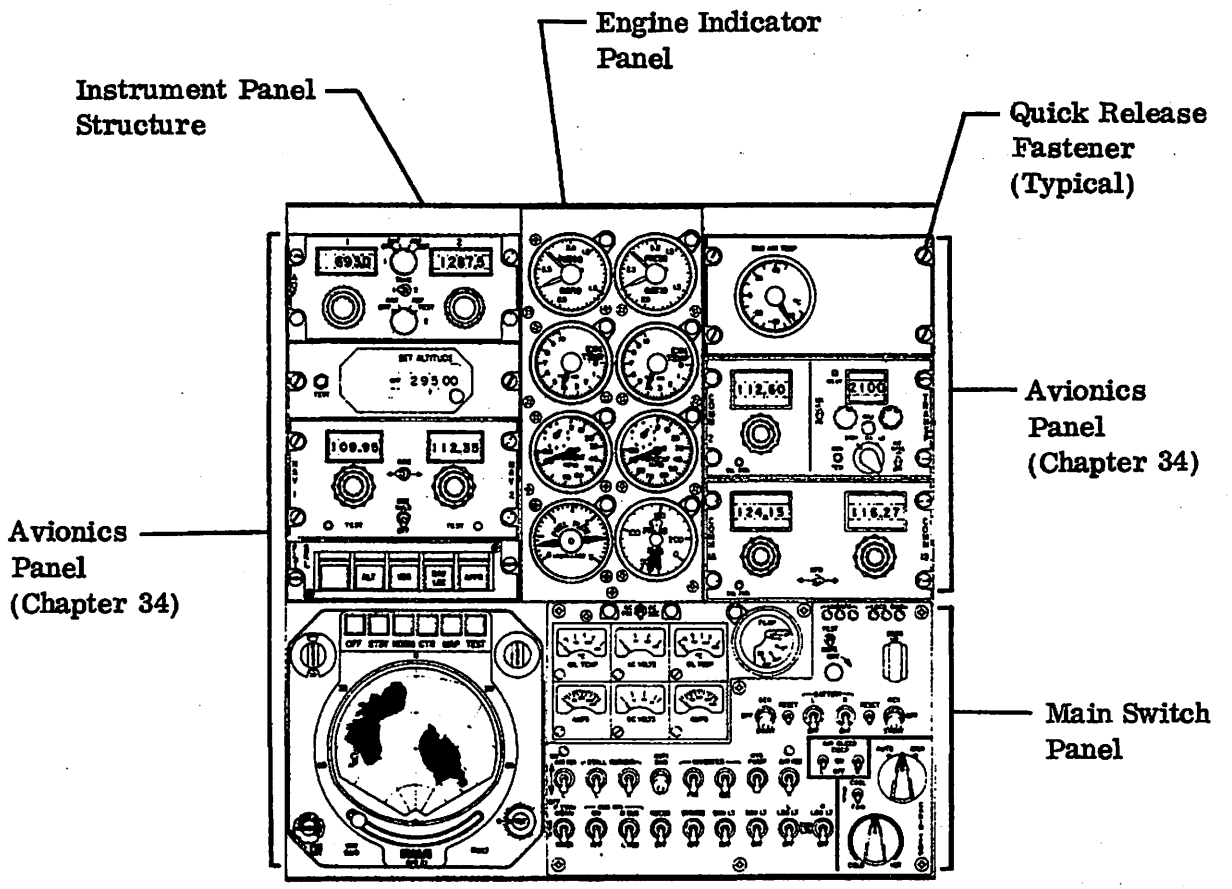
1. Removal/Installation

NOTE: • The center panel is made up of the avionics control panels, engine indicator panel, and main switch panel.
• The panels that comprise the center panel are secured to the instrument panel structure by quick release fasteners.

A. Remove Center Instrument Panel Components (See figure 201)
 (1) Assure that Battery Switch and all panel switches are OFF.
 (2) Pull all applicable system circuit breakers.
 (3) Loosen applicable quick release fasteners and pull panel out far enough to disconnect connectors.
 (4) Remove panel.

B. Install Center Instrument Panel Components (See figure 201)
 (1) Hole panel in place in front of panel mount hole and connect connectors.
 (2) Install panel onto instrument panel structure and secure with quick release fasteners.
 (3) Reset applicable circuit breakers.
 (4) Perform an operational check of applicable system.





Detail A

Typical Center Instrument Panel
Figure 201

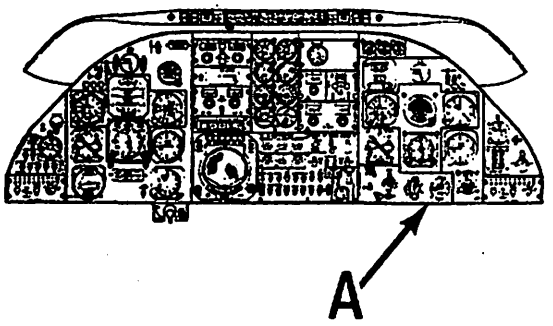
COPILOT'S INSTRUMENT PANEL - MAINTENANCE PRACTICES

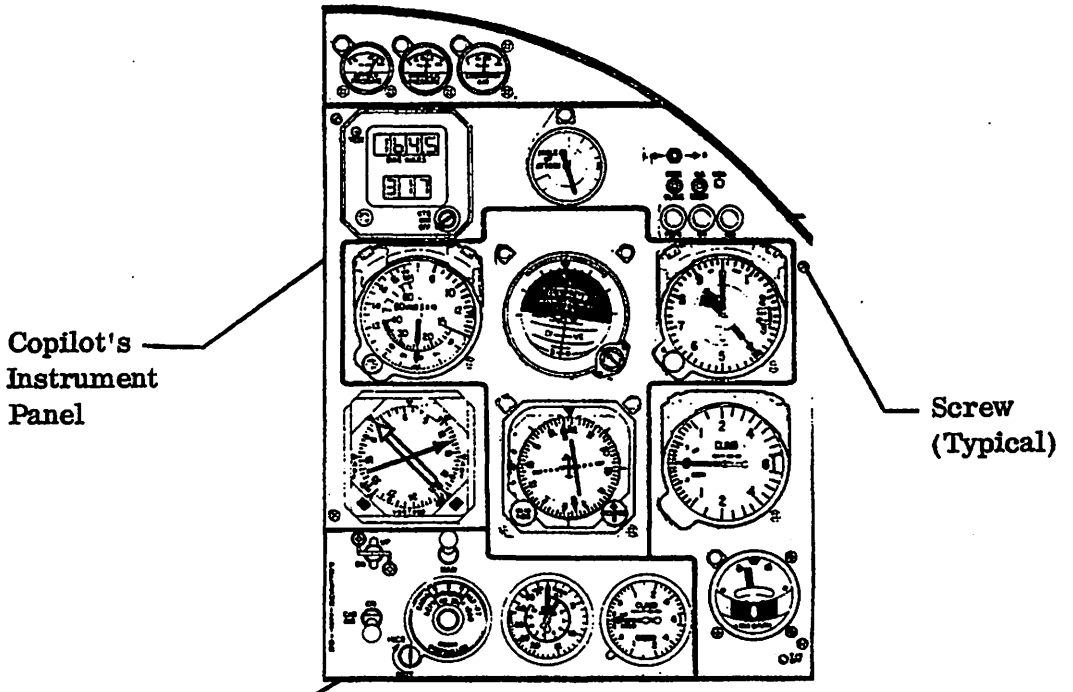
1. Removal/Installation

NOTE: The copilot's instrument panel consists of a structure assembly secured to the main instrument structure by screws. The copilot's instrument panel is secured to the pressurization module (Chapter 21) which is hinged along the forward edge. This allows the panel to be lowered for maintenance of the panel components.

A. Remove Copilot's Instrument Panel (See figure 201)
 (1) Assure that Battery and Stall Warning Switches are OFF.
 (2) Pull and tag applicable system circuit breakers.
 (3) Remove screws securing panel to structure.
 (4) Lower panel and disconnect electrical plugs, pitot and static lines from instruments.
 (5) Tag all electrical wiring plugs.
 (6) Cap all exposed pitot and static lines.
 (7) Raise panel and temporarily secure with two screws.
 (8) Remove screws securing pressurization module to copilot's panel structure.
 (9) Lower module clear of instrument panel.
 (10) Support instrument panel and remove two screws.
 (11) Remove instrument panel from aircraft.

B. Install Copilot's Instrument Panel (See figure 201)
 (1) Position copilot's instrument panel on main panel structure and temporarily secure with two screws.
 (2) Secure pressurization module to copilot's instrument panel with attaching screws.
 (3) Remove screws temporarily securing copilot's instrument panel to main panel structure.
 (4) Remove caps from pitot and static lines and connect lines to applicable instrument.
 (5) Connect electrical plugs to applicable instruments.
 (6) Raise and secure copilot's panel to main instrument panel structure.
 (7) Perform pitot/static leakage check (Chapter 34).
 (8) Reset applicable circuit breakers.





Detail A

Typical Copilot's Instrument Panel
Figure 201

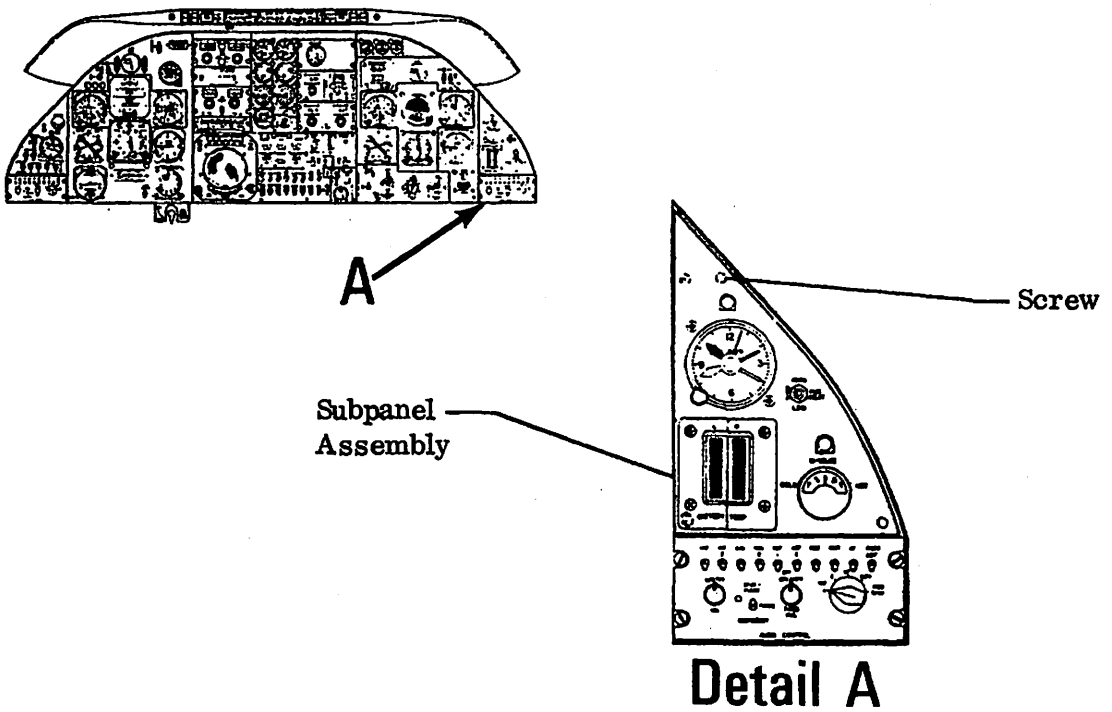
COPILOT'S SUBPANEL - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: • The copilot's subpanel is secured to the instrument panel structure by screws.
• The copilot's subpanel assembly consists of a structure assembly and various switches and indicators.

A. Remove Copilot's Subpanel (See figure 201)
(1) Assure that Battery Switches and all panel switches are OFF.
(2) Pull all applicable system circuit breakers.
(3) Remove attaching parts securing subpanel to instrument panel structure.
(4) Disconnect electrical connectors.
(5) Remove subpanel assembly.

B. Install Copilot's Subpanel (See figure 201)
(1) Position subpanel in instrument panel structure and connect electrical connectors.
(2) Secure subpanel onto instrument panel with attaching parts.
(3) Reset applicable circuit breakers.
(4) Perform an operational check of applicable systems.



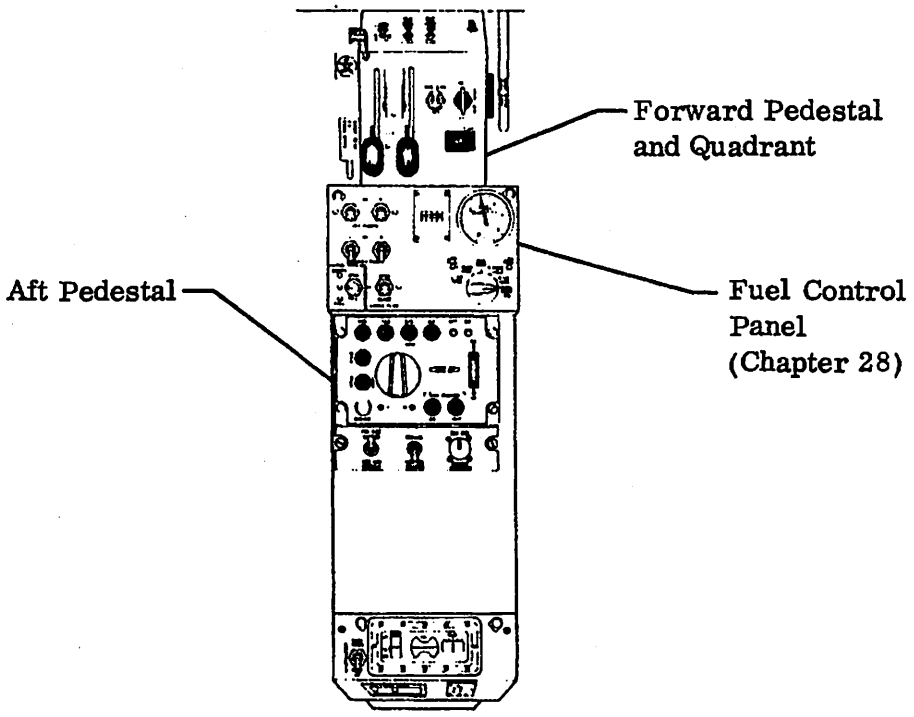
Typical Copilot Subpanel Assembly
Figure 201

CENTER PEDESTAL - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE:
- The center pedestal consists of the forward pedestal and quadrant section and aft pedestal section.
- The aft pedestal section provides mounting for the radio equipment, autopilot controller, yaw damper control head and fuel control panel. The trim indicator panel and fuel control panel are secured to the pedestal structure by screws. The radio equipment, autopilot controller and yaw damper control head utilize receptacle strips to secure to pedestal structure.
- The forward pedestal and quadrant assembly provides mounting for the throttle, spoiler, flap, parking brake, and emergency brake controls. Refer to applicable chapter for removal of equipment in forward pedestal and quadrant assembly.

A. Equipment installed in the pedestal is secured by either screws or receptacle strips. Removal and installation of this equipment consists mainly of:
(1) Loosening or removing attaching parts.
(2) Removing equipment sufficiently to gain access to electrical plug.
(3) Disconnecting electrical plug and remove equipment from aircraft.



Center Pedestal
Figure 201

MULTIPURPOSE ELECTRICAL AND ELECTRONIC PARTS - DESCRIPTION AND OPERATION

1. Description

A. The freon and stabilizer heater relay box (E173) is located on the LH side of the tailcone equipment section just forward of frame 27.

(1) The relay box is secured to mounting brackets by four screws. The relay box incorporates a removable cover for access to the relays without removing the relay panel.

(2) All electrical connections are made by an electrical plug mounted on the relay panel.

(3) The relay box contains relays which control the operation of the refrigeration, stabilizer heater, and auxiliary cabin heater systems during different modes of operation.

(a) Generator Relays - These relays, when energized (STARTER-GENERATOR Switch set to GEN), completes the following circuits.

(1) The control circuit for the freon power relay (Refer to Chapter 21).

(2) The control circuit for the auxiliary cabin heater cutout relay (Refer to Chapter 21.)

(3) The control circuit for the auxiliary cabin heater system switch.

(4) The control circuit for the LH & RH nacelle heater power relays (Refer to Chapter 30).

(b) External Power Relay - This relay is energized when external power is connected to the aircraft and either or both Battery Switches are set to "on". The relay, when energized, completes the following two circuits.

(1) A control circuit for the freon power relay, bypassing the generator relay.

(2) A power circuit through the deenergized auxiliary heat cutout relay to the auxiliary heater circuit breaker.

(c) Start Cutout Relays - These relays are energized when either Starter-Generator Switch is set to START. When energized, the circuits for the freon, nacelle heat and stabilizer heat system are opened.

(d) Cabin Blower Relay - This relay is energized when (1) the Cool System Switch is set to either COOL SYS or FAN; (2) the Auxiliary Heater Switch is set to either HIGH or LOW. The relay completes a 28 vdc power circuit to the evaporator blower motor.

(e) Auxiliary Heater Cutout Relay - This relay, when deenergized, completes a power circuit from the energized generator relay to AUX CAB HT circuit breaker. (Refer to Chapter 21.) The relay is energized when the Cool System Switch is set to COOL SYS. This prevents the refrigeration system and the auxiliary cabin heater system from operating at the same time.

(f) Stabilizer Heat Relay. This relay is energized when power is applied to the stabilizer heaters. When energized, the relay completes a ground circuit to extinguish the (amber) STAB HEAT caution light on the glareshield.

(g) Stabilizer Heat Cutout Relay - This relay is energized by the RH squat switch when the aircraft is on the ground. When energized the relay opens the control circuit for the auxiliary heater system switch.

B. The main switch panel is located in the lower right hand portion of the center instrument panel. The switch panel is illuminated by post lights and back lighted with BEP lights.

(1) The main switch panel houses the engine instrument cluster, the flap position indicator, cabin climate control panel, landing gear control, external lighting switches, air ignition switches, stall warning switches, inverter switches, anti-skid switch, pitch trim switch, battery switches, generator reset switches, starter-generator switches, the auxiliary hydraulic switch and a dimmer switch.

C. The landing gear squat switch relay panel is located behind the copilot's instrument panel on frame 5.

(1) The squat switch relay panel consists of relays which are energized when the aircraft is resting on the landing gear. The relays, when energized, complete the following circuits.

(a) A circuit is completed, connecting the rudder position sensor to the nose wheel steering computer. (Refer to Chapter 32.)

(b) A circuit is completed to the pressurization system module solenoids. (Refer to Chapter 21.)

(c) Two circuits are completed to the windshield anti-ice control system. (Refer to Chapter 30.)

(d) A circuit is opened to the aircraft hour meter. (Refer to Chapter 39, Wiring Diagram Manual.)

(e) Refer to Chapter 39, Wiring Diagram Manual for complete wire diagram of the squat switch relay panel.

FREON AND STABILIZER HEATER RELAY BOX - MAINTENANCE PRACTICES

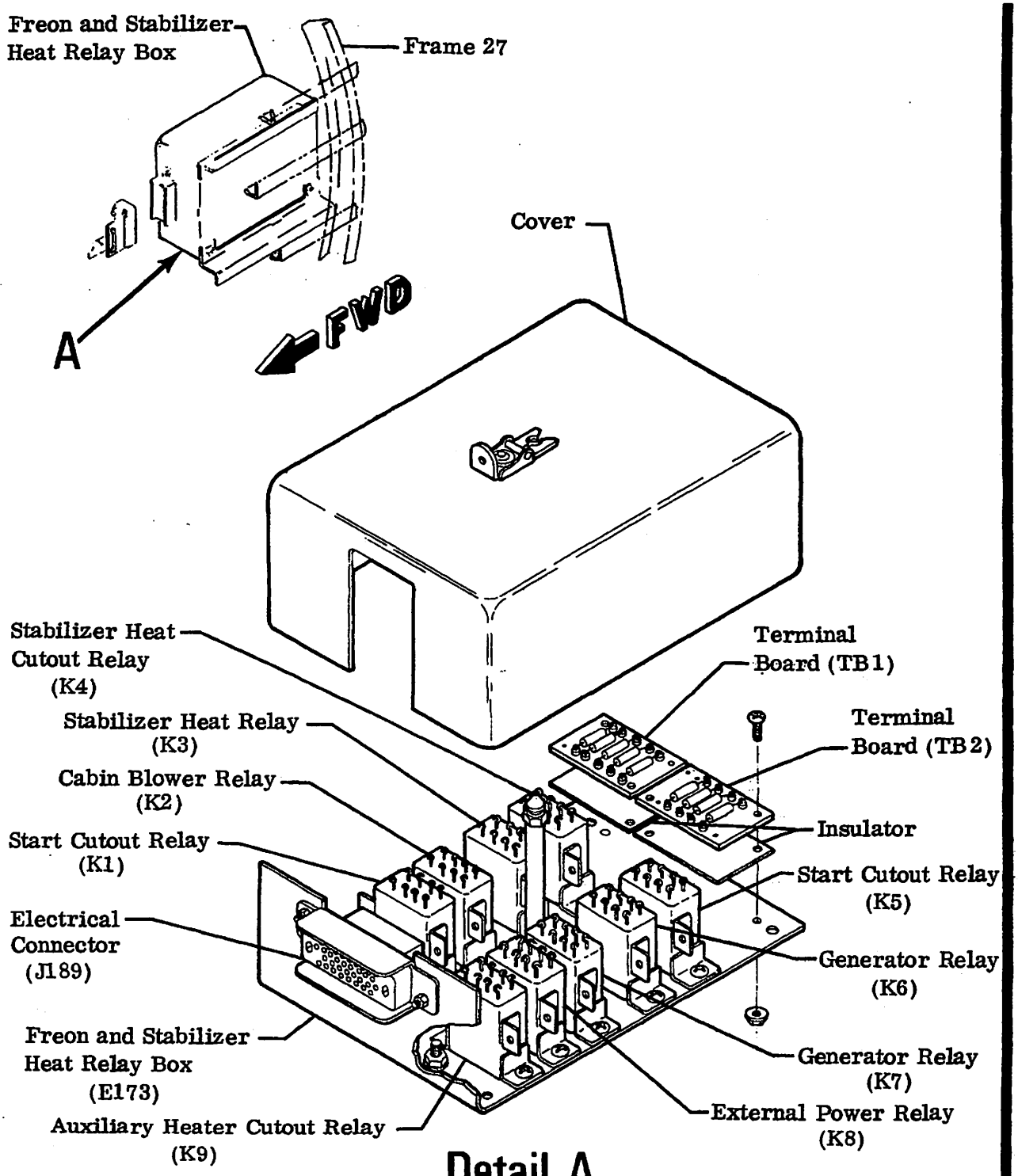
1. Removal/Installation

A. Remove Freon and Stabilizer Heater Relay Box (See figure 201)

(1) Lower tailcone access door.
(2) Disconnect aircraft batteries.
(3) Disconnect electrical plug from relay box.
(4) Release cover latch and remove cover.
(5) Loosen and remove attaching parts and relay box from aircraft.

B. Install Freon and Stabilizer Heater Relay Box (See figure 201)

(1) Install relay box and secure with attaching parts.
(2) Install and secure cover.
(3) Connect electrical plug to relay box.
(4) Connect aircraft batteries.
(5) Raise and secure tailcone access door.



Freon and Stabilizer Heater Relay Box
Figure 201

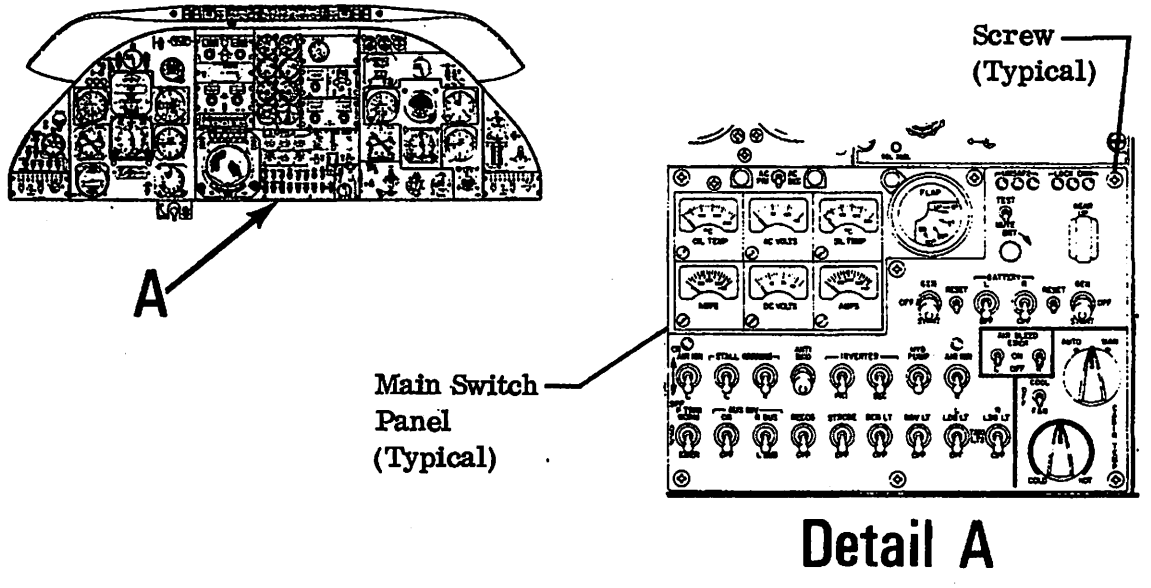
MAIN SWITCH PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE:
- The main switch panel is located in the lower right hand portion of the center instrument panel. The switch panel is illuminated by post lights and back lighted with BEP lights.
- The main switch panel houses the engine instrument cluster, the flap position indicator, cabin climate control panel, landing gear control, external lighting switches, air ignition switches, stall warning switches, inverter switches, anti-skid switch, pitch trim switch, battery switches, generator reset switches, starter-generator switches, the auxiliary hydraulic switch and a dimmer switch.

A. Remove Main Switch Panel (See figure 201)
 (1) Lower tailcone access door and disconnect aircraft batteries.
 (2) Loosen and remove the screws around the perimeter of the switch panel.
 (3) Tag and disconnect electrical connectors and remove switch panel from instrument panel.

B. Install Main Switch Panel (See figure 201)
 (1) Connect electrical connectors and position switch panel on instrument panel.
 (2) Secure switch panel with screws.
 (3) Assure that all switches are in the original position.
 (4) Connect aircraft batteries and secure tailcone access door.



Main Switch Panel
Figure 201

SQUAT SWITCH RELAY PANEL - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Squat Switch Relay Panel (See figure 201)

(1) Remove the copilot's instrument panel. (Refer to 39-10-05, Copilot's Instrument Panel.)

(2) Remove the attaching parts and pull relay panel away from frame 5.

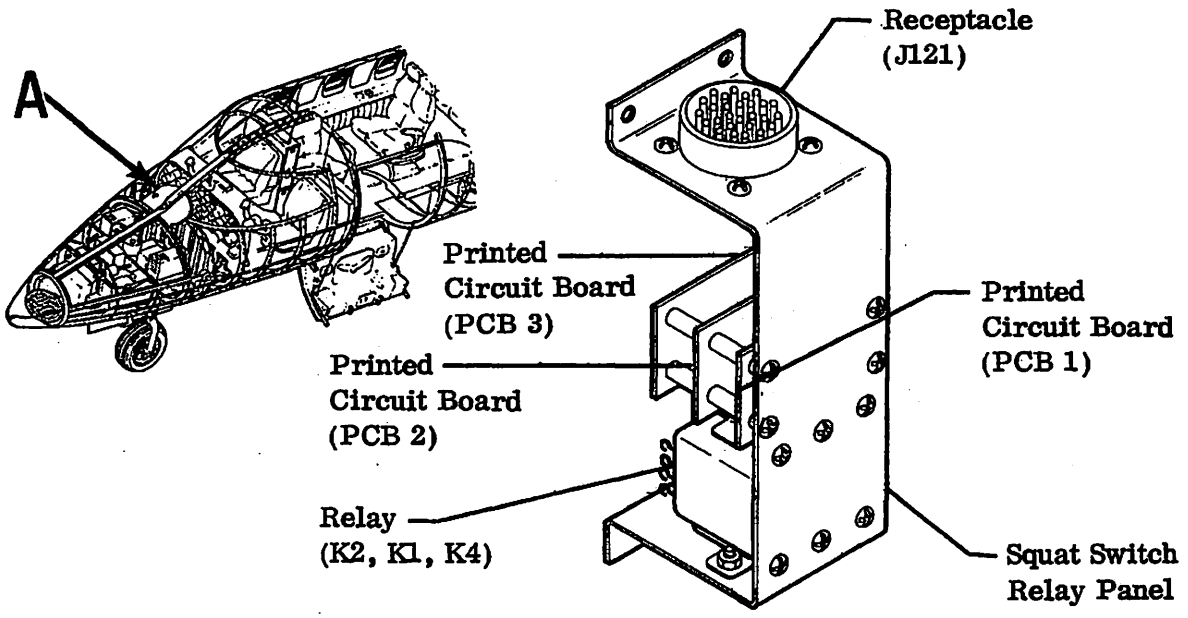
(3) Disconnect electrical connector from relay panel and remove panel from aircraft.

B. Install Squat Switch Relay Panel (See figure 201)

(1) Connect electrical connector to relay panel.

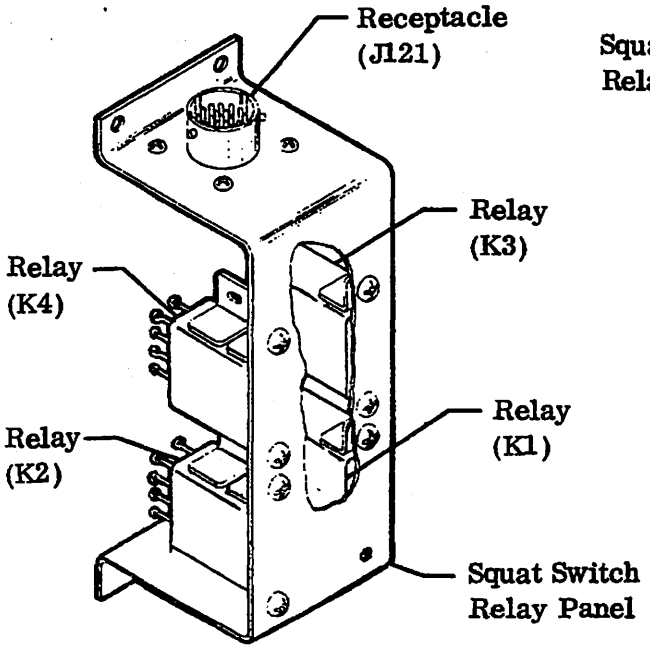
(2) Install relay panel on frame 5 and secure with attaching parts.

(3) Install copilot's instrument panel. (Refer to 39-10-05, Copilot's Instrument Panel.)



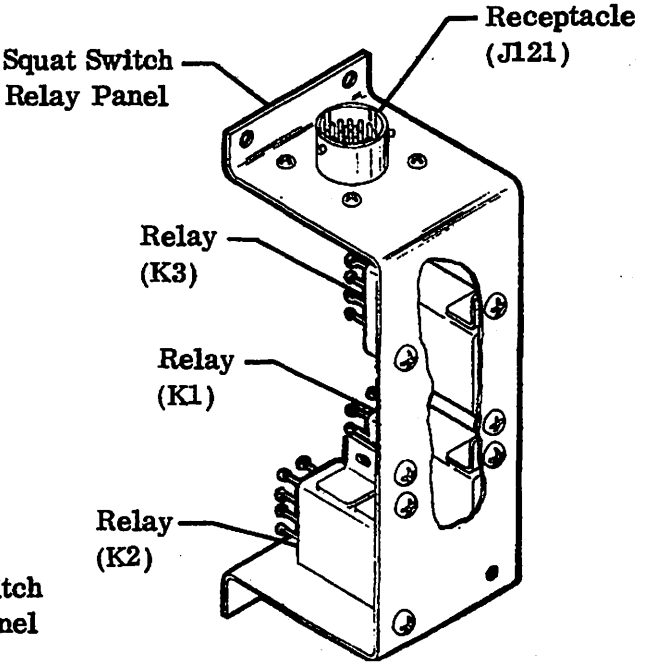
Aircraft 25-227 and Subsequent

Detail A



Aircraft 25-061, 25-070 thru 25-226
Aircraft Equipped with Hobbs Hour Meter

Detail A



Aircraft 25-061, 25-070 thru 25-226

Detail A

Squat Switch Relay Panel
Figure 201